I-90 Sunset Way Interchange Expansion Evaluation

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Jason Gibbens

Washington State Department of Transportation

Northwest Region
Traffic Systems Management Center
(206) 440-4790

Overview

On August 29th, 2003, the Washington State Department of Transportation completed a project to greatly expand the I-90 Sunset Way interchange in Issaquah. Since the expanded interchange opened, on- and offramp volumes at the nearby Front Street interchange have decreased markedly. Volumes have changed little for Issaquah's other freeway interchange, I-90 at State Route 900. With the additional freeway access now available at Sunset Way, total volumes entering and exiting the freeway in Issaquah have grown.

It is reasonable to assume that congestion eased along Front St (and adjoining surface roadways) because of that interchange's significant ramp volume reductions. However, because WSDOT's vehicle detection network does not cover Issaquah city streets, a data-based evaluation of surface street congestion is impossible. Congestion on I-90 has increased slightly since completion of the project.

Background

Prior to the expansion project, the Sunset interchange consisted only of an eastbound onramp and a westbound offramp to Sunset Way. The revamped interchange includes a new eastbound offramp to Sunset Way, an eastbound flyover exit ramp that connects directly to just-completed Highlands Drive, a new westbound on ramp, and a realigned westbound offramp and eastbound onramp.

In addition to providing new access between the Issaquah Highlands, Sammamish Plateau and I-90, the expanded interchange was designed to take some of the burden off of the overtaxed Front Street and State Route 900 interchanges and reduce congestion on city and county streets.

Data Collection

We used data from vehicle sensor loops imbedded in the roadway to examine traffic patterns at all three Issaquah interchanges: Sunset Way (Exit 18), Front St (Exit 17), and SR 900 (Exit 15). Total daily and peak period volumes were collected for all ramps. The eastbound exit ramps were analyzed for the evening peak period, from 4 to 7 pm. The morning peak period, considered for the westbound onramps, covered 6 to 9 am.

Data from four months were analyzed: September 2002 and August 2003 (one year and one month prior to the expanded interchange's opening, respectively), September 2003 (immediately following the project's completion), and April 2004. Only average weekdays free of major incidents were included in the analysis.

Ramp Effects

Eastbound offramps

As Figures 1 and 2 illustrate, the Sunset interchange expansion significantly reduced the volumes exiting I-90 at Front St, the nearest interchange to Sunset Way. Both daily and evening peak period volumes fell by 21% from August 2003 to April 2004. Because of the nearly 2.5 miles distance between the Sunset and SR 900 interchanges, the effects at SR 900 were predictably less significant than at Front St. The SR 900 offramp volumes initially decreased after the project's completion, but have since rebounded to levels equal to or greater than those of August 2003.

Although the Front St offramp volumes have decreased, the total number of vehicles exiting I-90 in Issaquah has risen following the Sunset expansion. Between August 2003 and April 2004, the sum of the three exits' daily volumes has increased from 44, 700 to nearly 50, 500. Twelve percent more vehicles are now accessing Issaquah since the project's completion.

Figures 3, 4 and 5 display the hourly volume trends for the offramps at each Issaquah interchange. Note the morning volume increases at SR 900 and the evening volume decreases at Front St.

Figure 1: I-90 Eastbound Offramp Daily Volumes

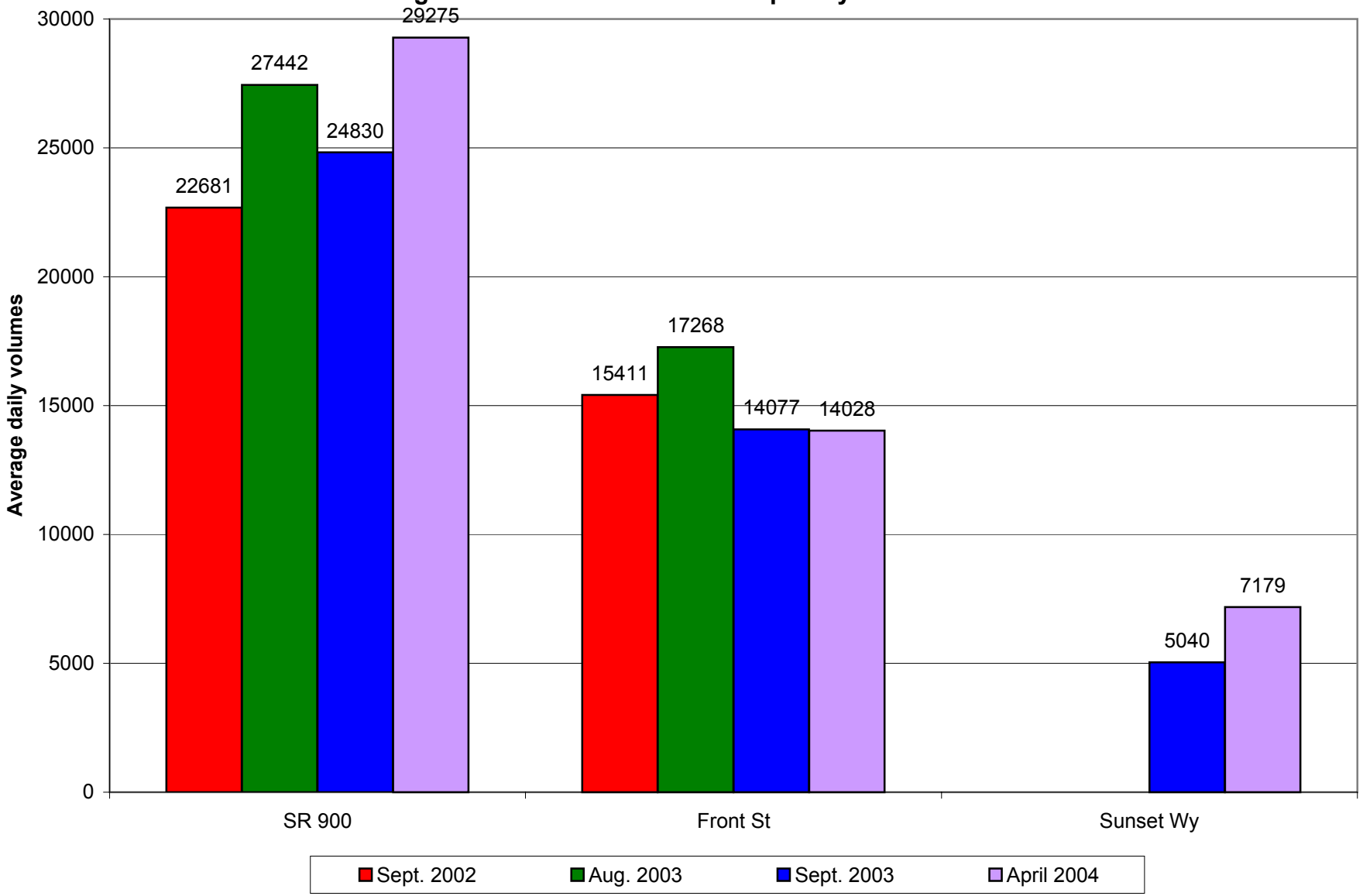


Figure 2: I-90 Eastbound Offramp Evening Peak Volumes

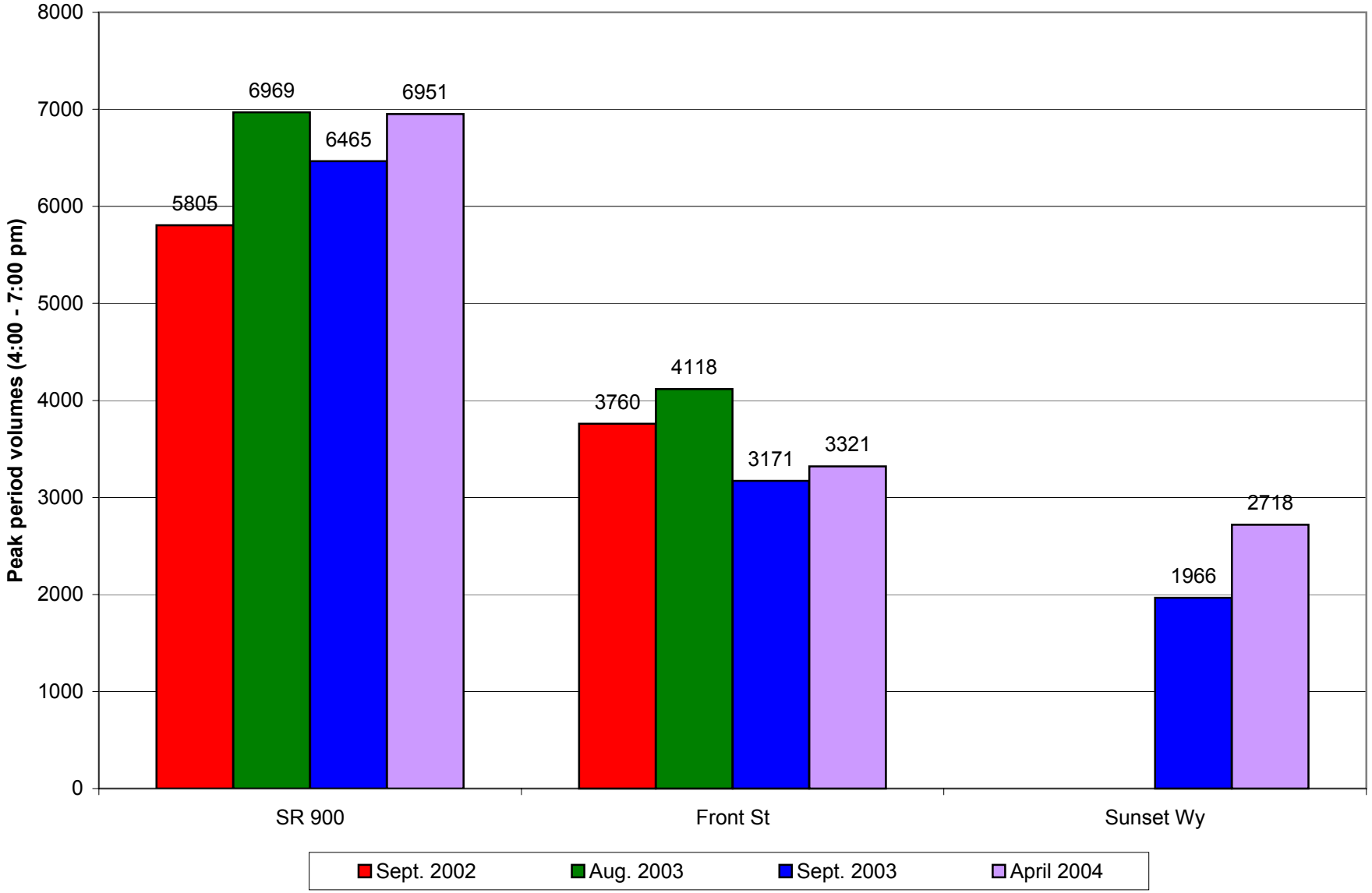


Figure 3: Sunset Way Eastbound Offramp Volume

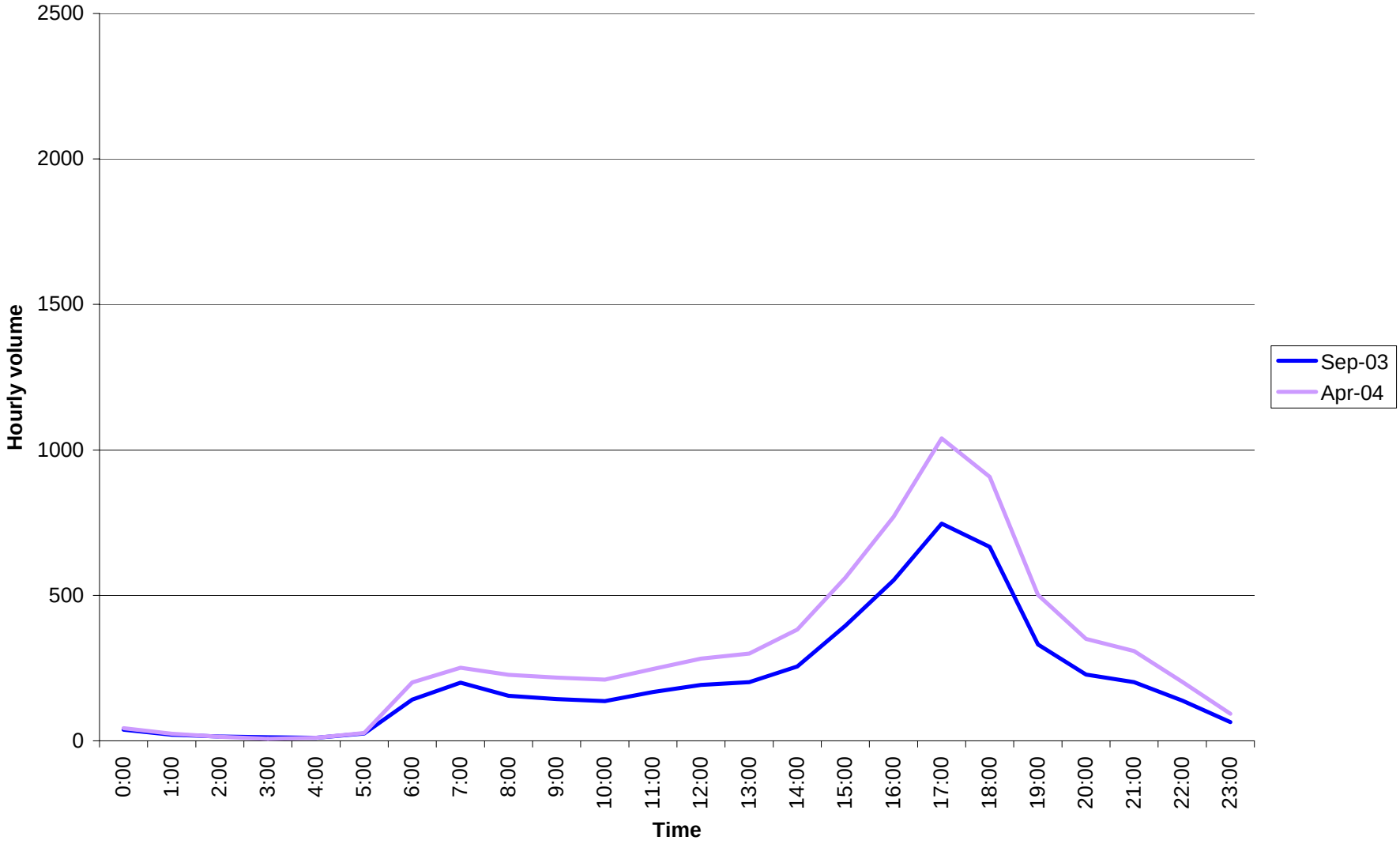


Figure 4: Front Street Eastbound Offramp Volume

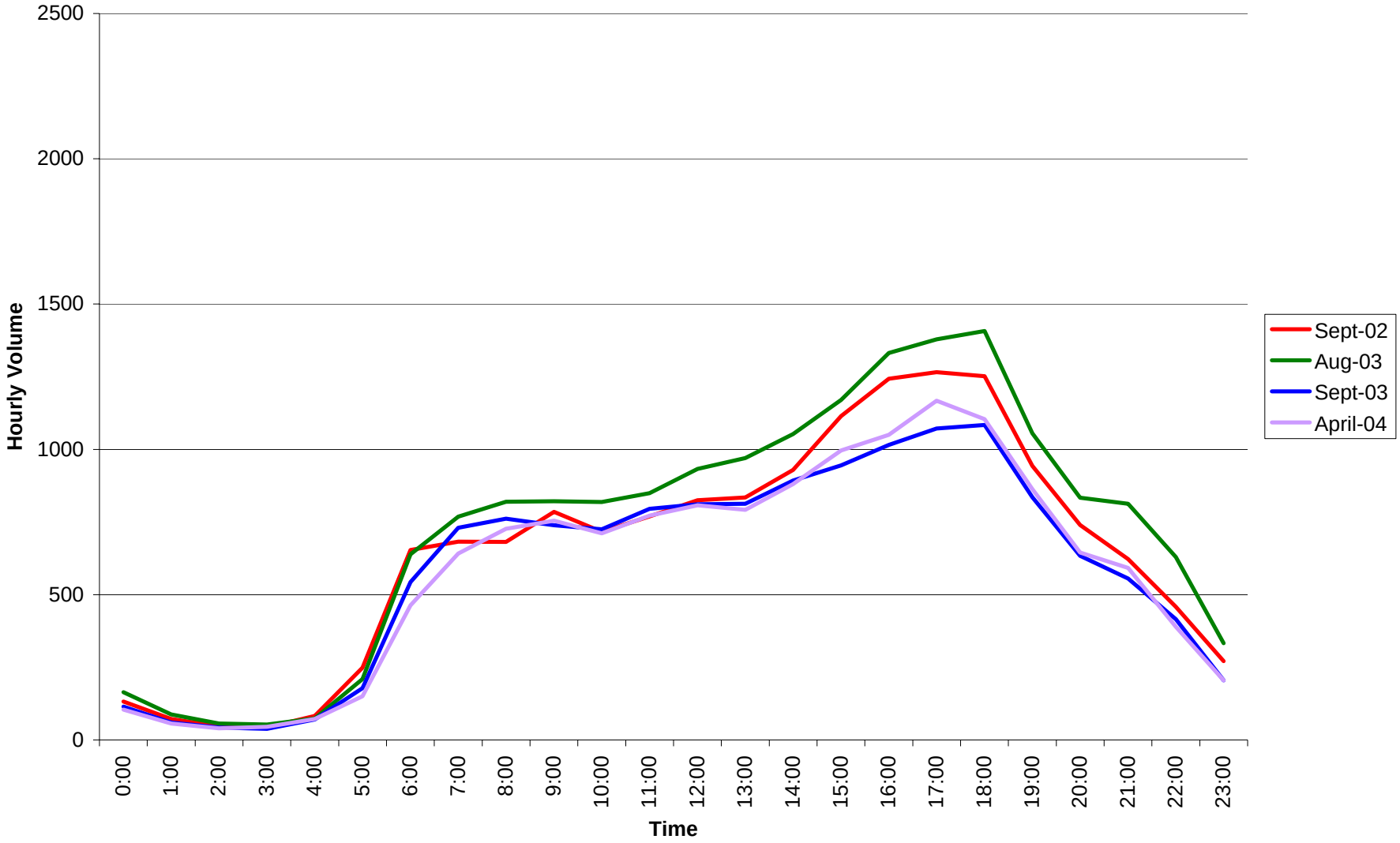
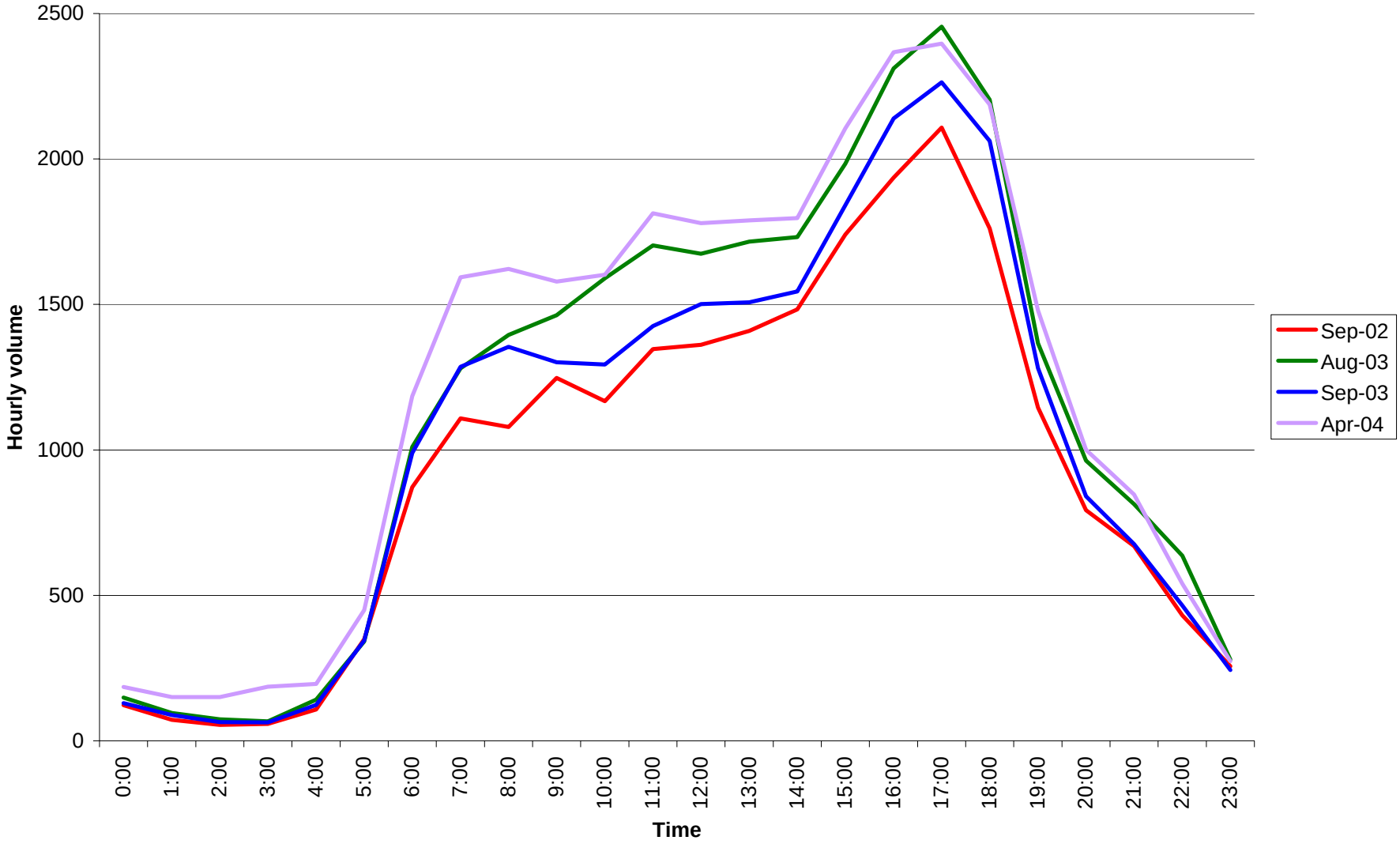


Figure 5: SR 900 Eastbound Offramp Volume



Westbound onramps

Figures 6 and 7 show the project's effects on the three westbound entrance ramps. As was the case with the freeway exits, the impacts at Front Street's onramp were much more significant than at the SR 900 ramp. From August 2003 to April 2004, volumes for the Front St entrance decreased by 13% for the day and by over 18% for the morning commute. The SR 900 onramp volumes changed very little during the same period; daily volumes dipped slightly while peak period volumes slightly increased.

Predictably, the total number of vehicles entering I-90 from Issaquah has increased with the addition of new freeway access from Sunset Way. Between August 2003 and April 2004, total onramp daily volumes rose by 7%, from 42,500 to 45,800.

Figures 8 through 10 show each onramp's hourly volumes over the course of an average weekday. The most noteworthy change since completion of the Sunset expansion is the dramatic volume reduction at the Front St onramp during the morning peak. The other graphs confirm the general trends illustrated in Figures 6 and 7.

Figure 6: I-90 Westbound Onramp Daily Volumes

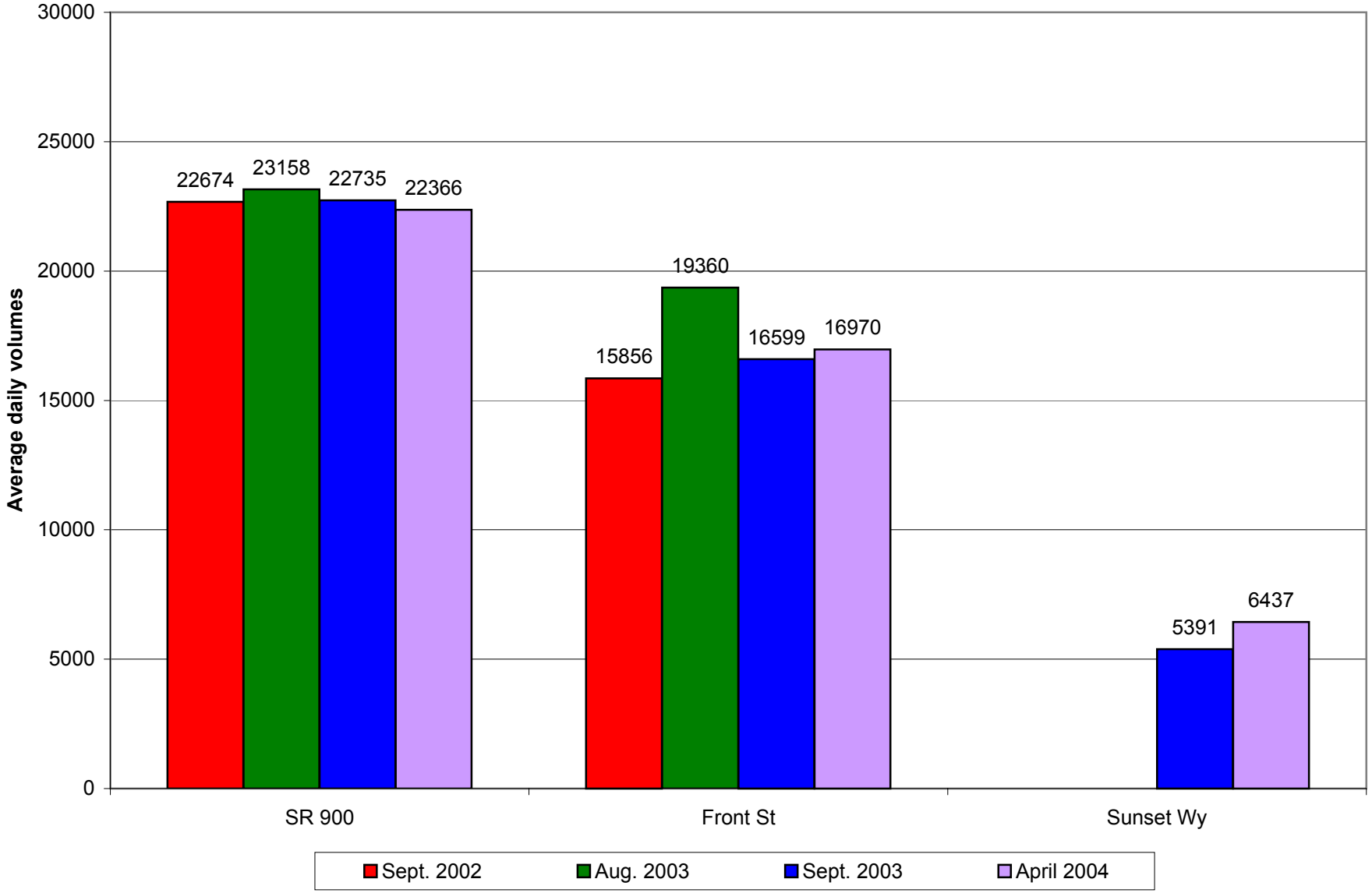


Figure 7: I-90 Westbound Onramp Morning Peak Volumes

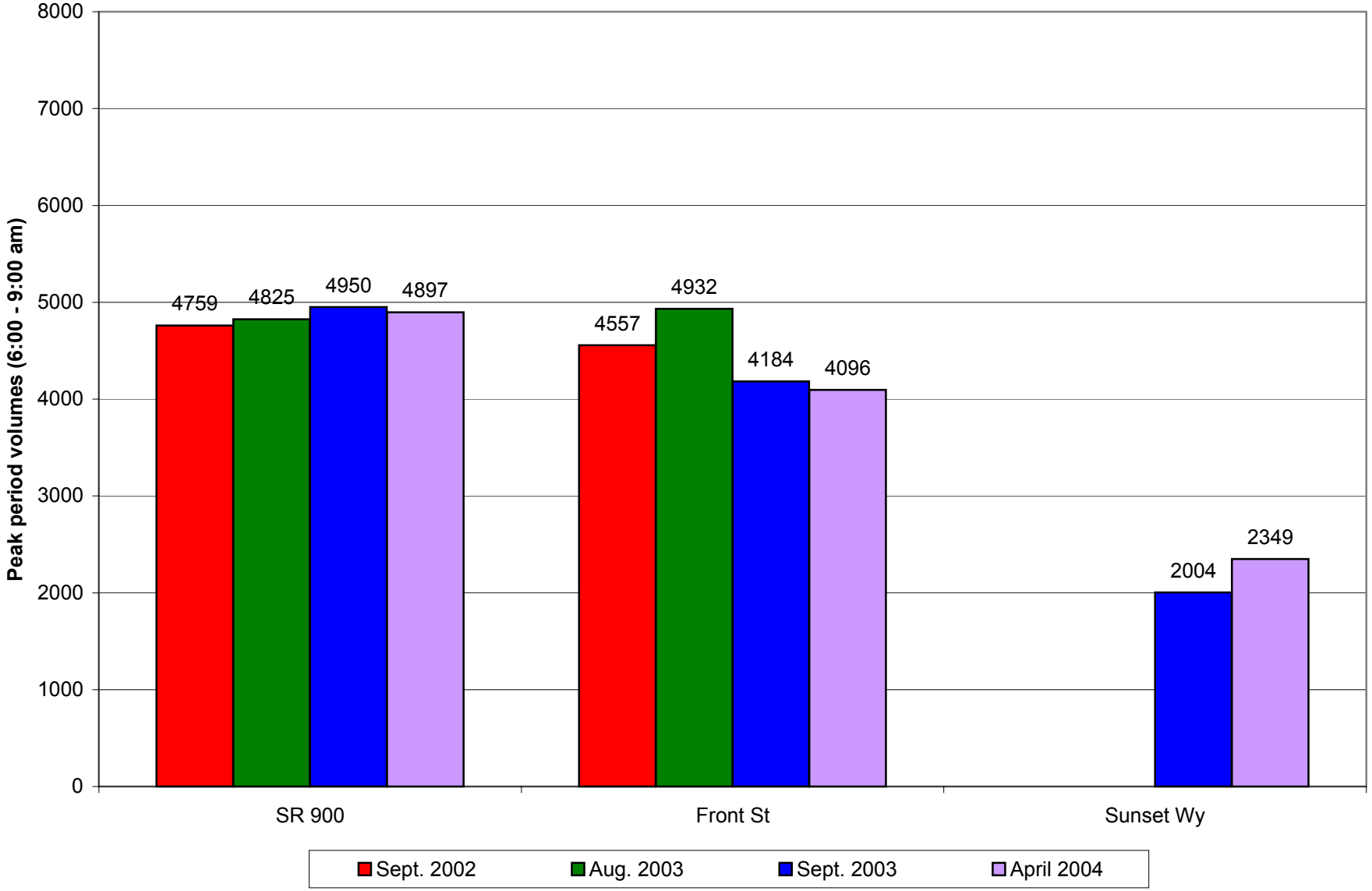


Figure 8: Sunset Way Westbound Onramp Volume

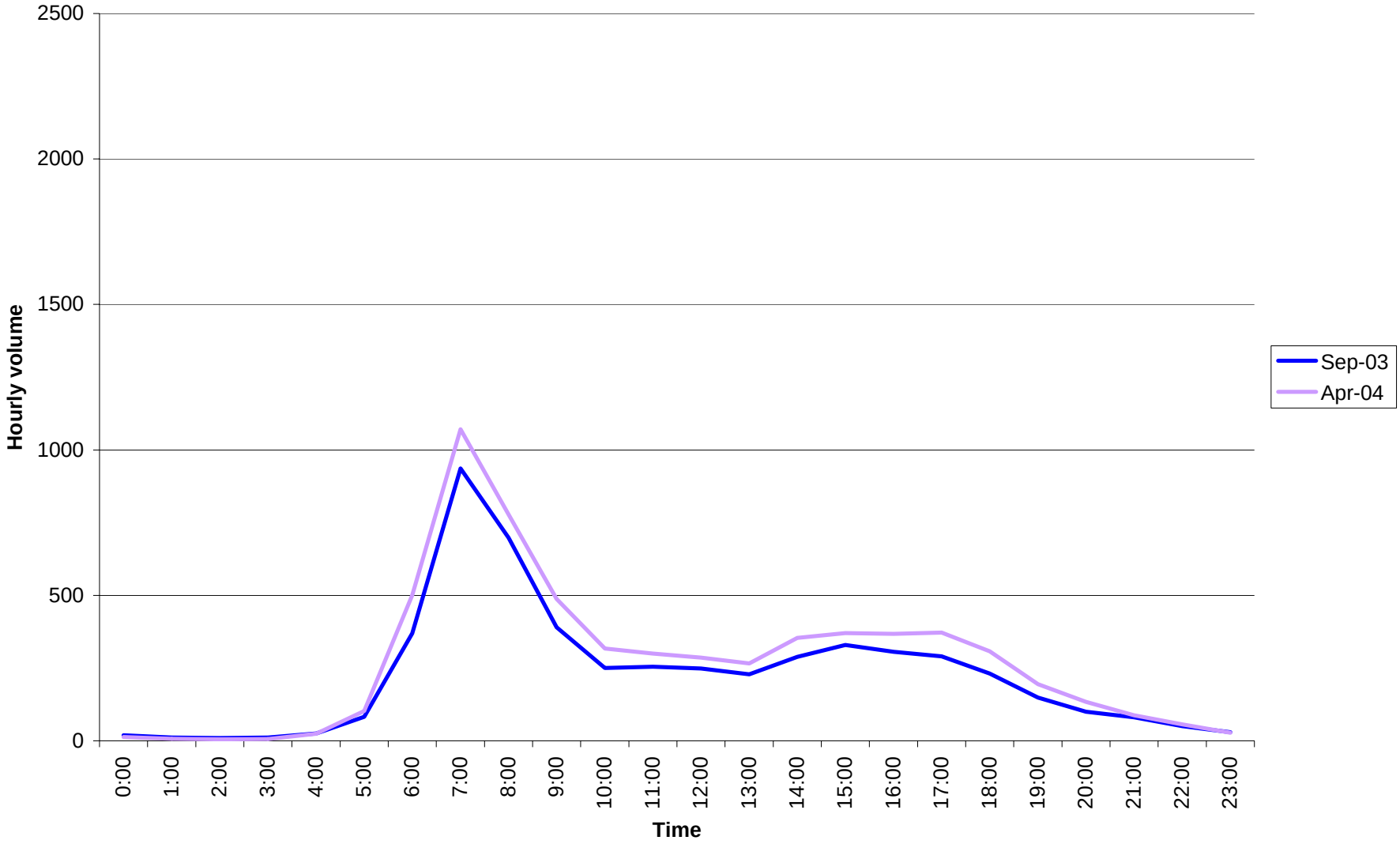


Figure 9: Front Street Westbound Onramp Volume

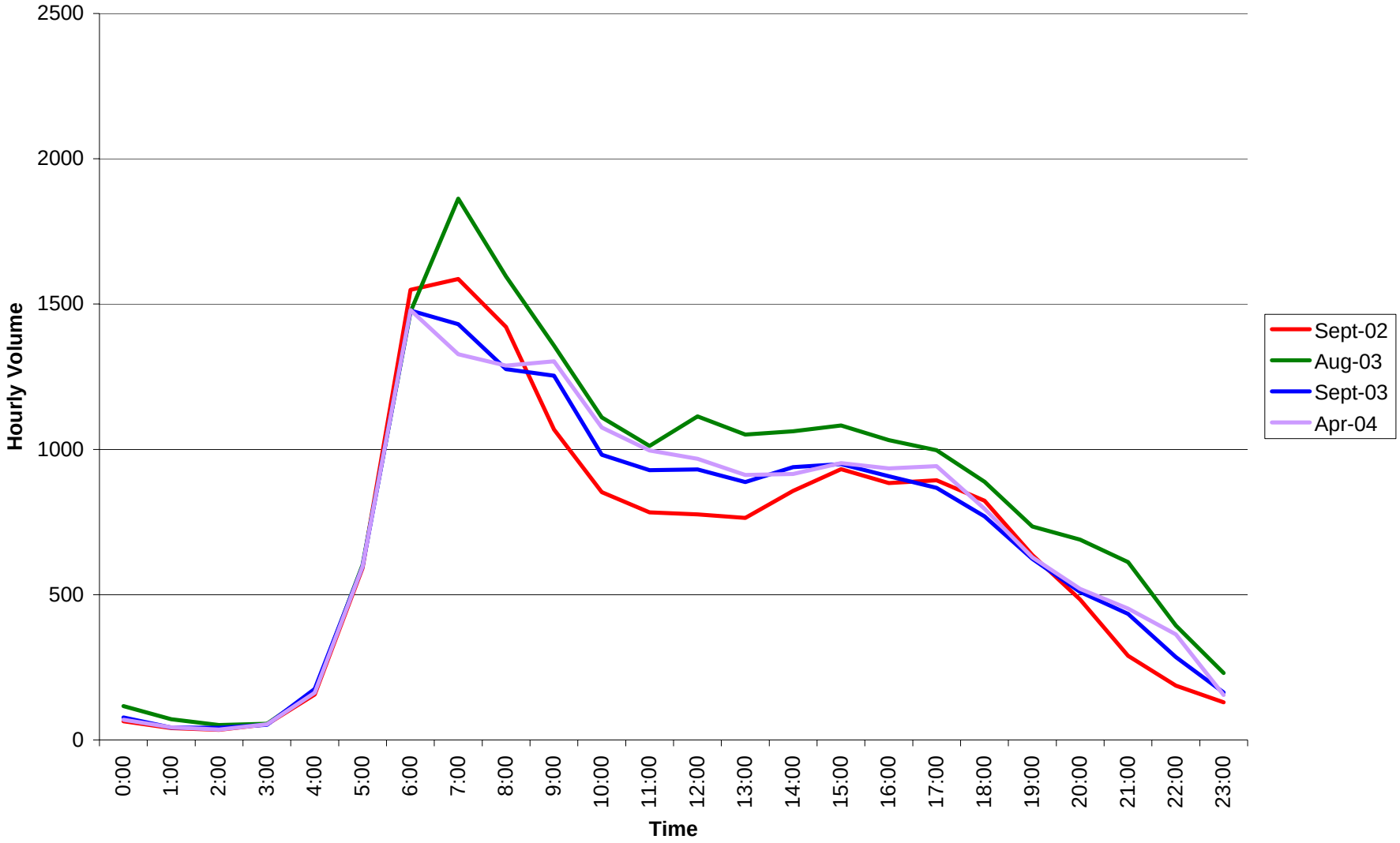
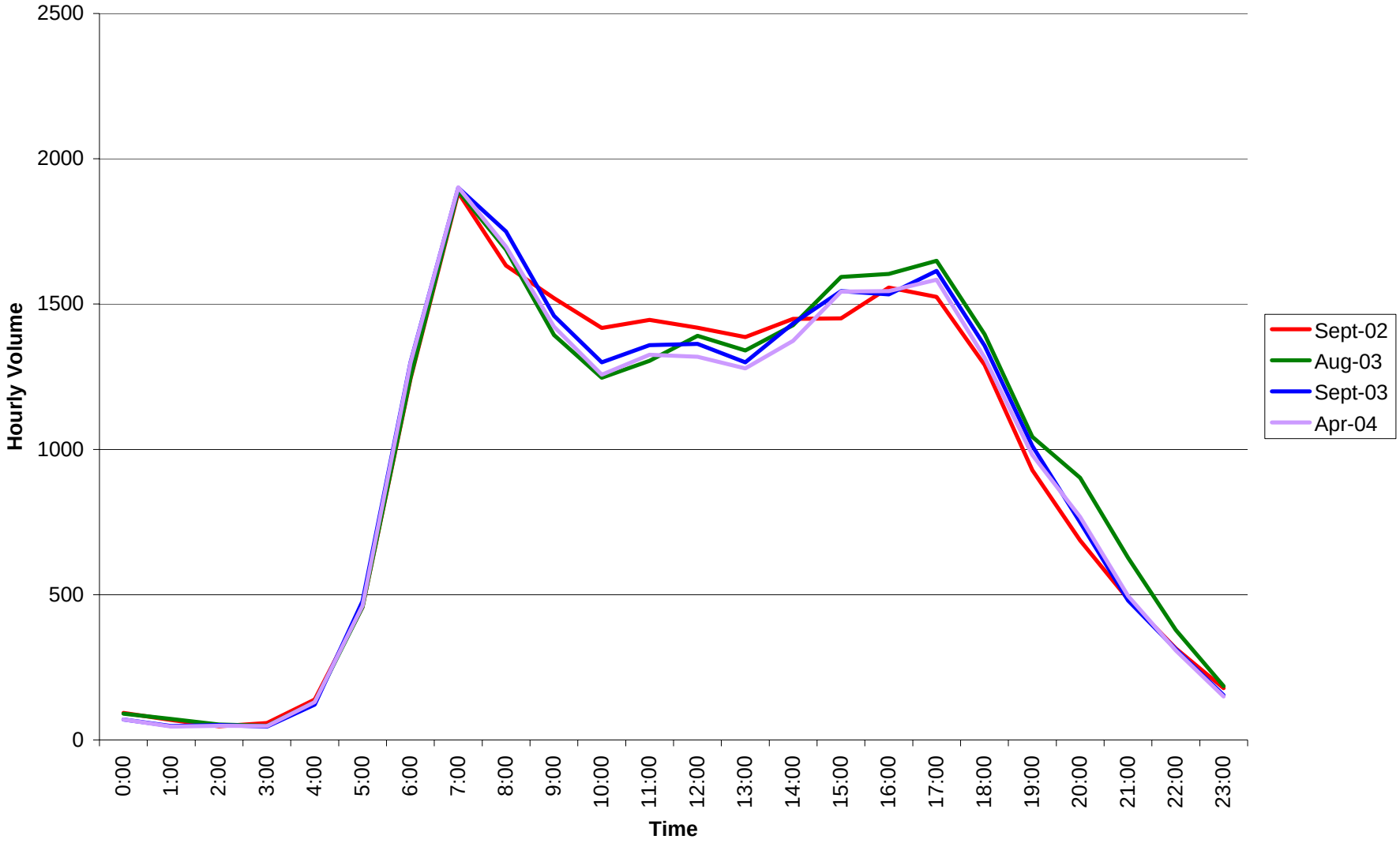


Figure 10: SR 900 Westbound Onramp Volume



Mainline Effects

Congestion is often quantified using a measurement called loop occupancy. Loop occupancy, the percentage of time that a loop detector is activated (or occupied) by vehicles traveling over it, was used to generate average congestion graphs for the four months considered in this study. Each graph (Figures 11 through 14) covers the westbound direction of I-90 between Issaquah and I-405.

Interstate 90 traffic congestion is slightly more severe now than prior to the Sunset Way project. Although seasonal variation makes the comparison imperfect, congestion increased slightly near SR 900 and West Lake Sammamish Parkway between August 2003 and April 2004. This trend is likely to continue as Issaquah, Sammamish and other communities along the I-90 corridor continue their recent growth.

Because of the sizable volume reductions at the Front Street on- and offramps, congestion on Front St and adjoining Issaquah streets presumably diminished after the Sunset interchange expansion. Unfortunately, gauging congestion changes on surface streets is not possible because WSDOT does not have vehicle sensors on Front St, SR 900, or other city streets.

Figure 11: I-90 Westbound Congestion (Sept. 2002 average weekdays)

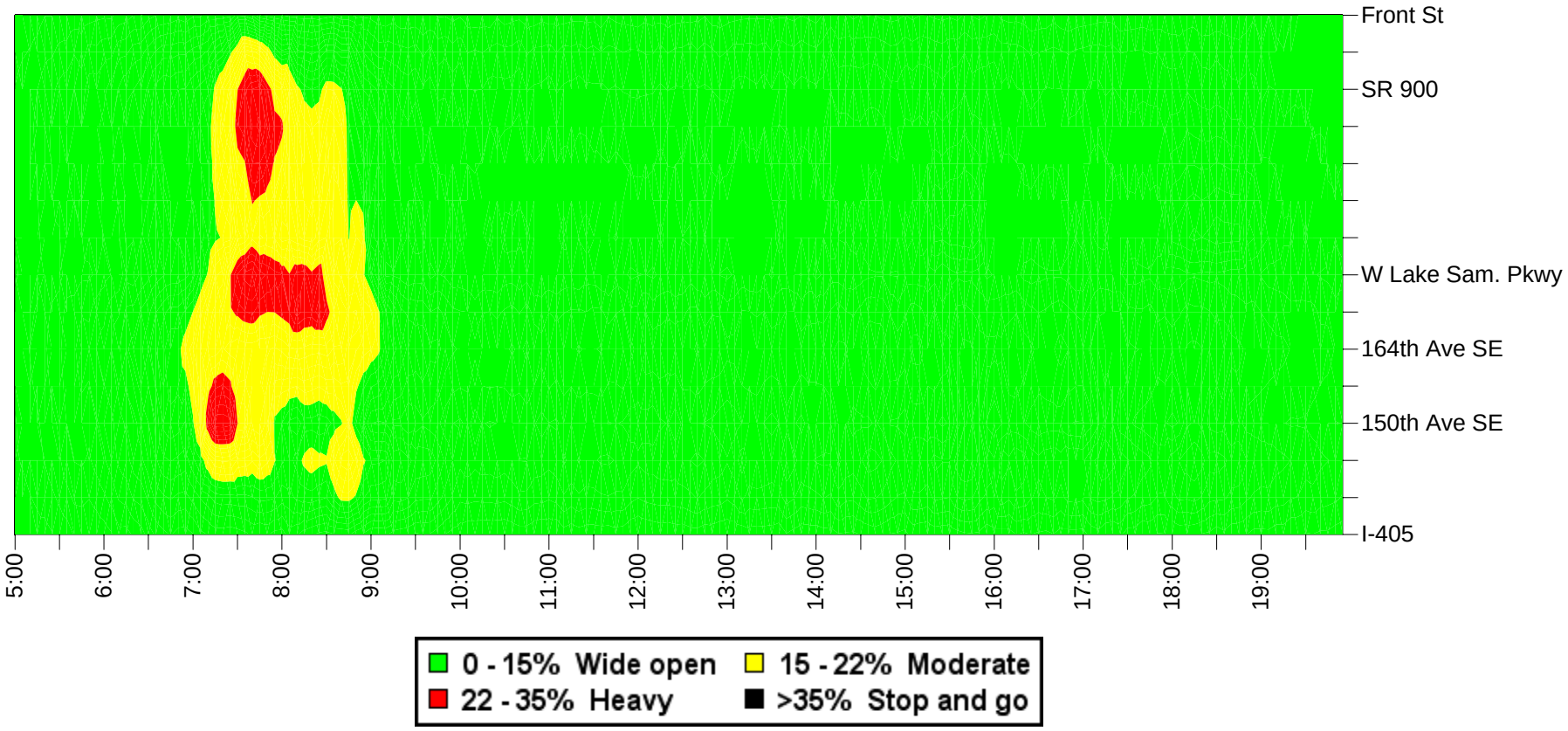


Figure 12: I-90 Westbound Congestion (August 2003 average weekdays)

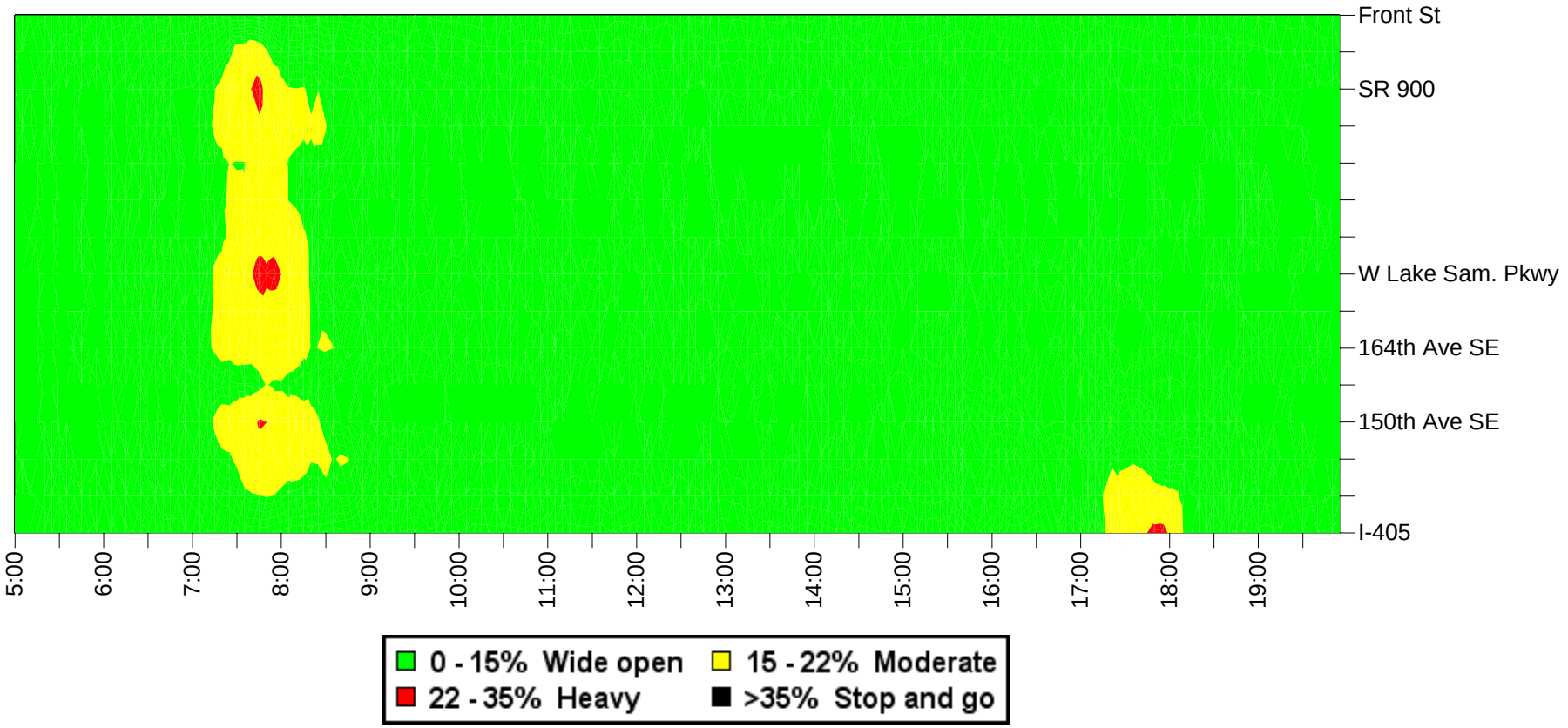


Figure 13: I-90 Westbound Congestion (Sept. 2003 average weekdays)

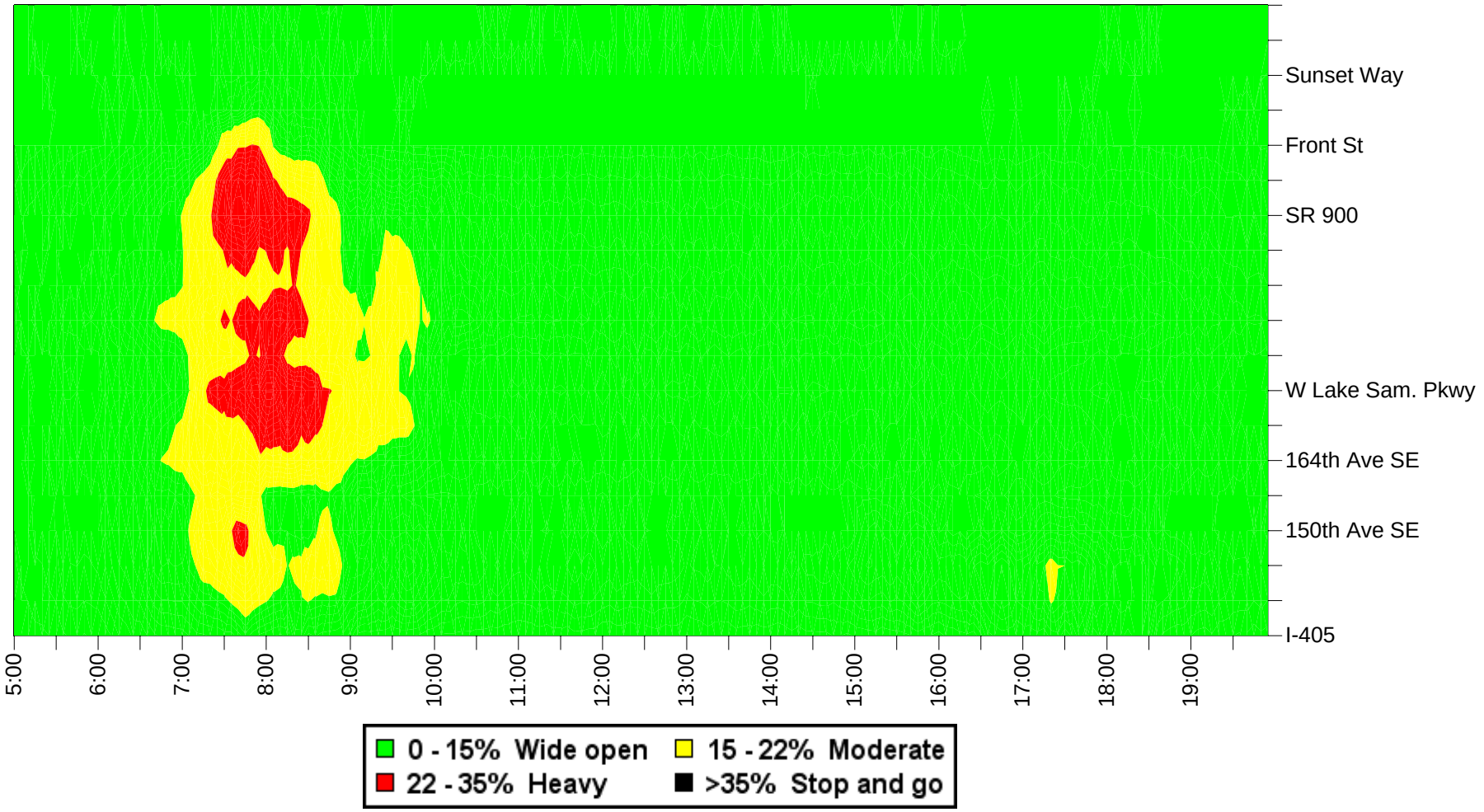


Figure 14: I-90 Westbound Congestion (April 2004 average weekdays)